2) Transferencia Normalizada

$$|T(jw)|^2 = \frac{1}{1 + \varepsilon^2 w^{2n}} \implies n=3 \implies |T(jw)|^2 = \frac{1}{1 + \varepsilon^2 w^6}$$

$$|T(jw)|^2 \Big]_{w=\frac{s}{j}} = \frac{1}{1 + \varepsilon^2 \left(\frac{s}{j}\right)^6} \implies |T(s)|^2 = \frac{1}{1 - \varepsilon^2 s^6} = \frac{1/\varepsilon^2}{\frac{1}{\varepsilon^2} - s^6} \,\text{//}$$

$$T(s) = \frac{c}{s^3 + s^2 a + sb + c}$$

$$T(-s) = \frac{c}{-s^3 + s^2 a - sb + c}$$

$$\left.\right\} \quad |T(s)|^2 = T(s) \cdot T(-s)$$

$$c = \frac{1}{\varepsilon}$$

$$0 s^4 = (-2b + a^2) s^4$$

$$0 s^2 = (2ac - b^2) s^2$$

$$\left.\right\}$$

$$2a - b^2 = 0 \implies b = \sqrt{2a} \implies b = \sqrt{\frac{2}{\varepsilon}} \cdot \sqrt[6]{\frac{8}{\varepsilon}} \implies b = 2\sqrt[3]{\frac{1}{\varepsilon^2}}$$

$$-2\sqrt{\frac{2a}{\varepsilon}} + a^2 = 0 \implies \frac{a^2}{2} = \sqrt{\frac{2a}{\varepsilon}} \implies \frac{\varepsilon}{8} \cdot a^4 - a = 0$$

$$a \cdot \left(\frac{\varepsilon}{8} \cdot a^3 - 1\right) = 0 \quad \nearrow a=0 \;\text{✗}$$
$$\searrow a = \sqrt[3]{\frac{8}{\varepsilon}} \implies a = 2\sqrt[3]{\frac{1}{\varepsilon}}$$

$$a = 2\sqrt[3]{\frac{1}{\varepsilon}} \;\text{//} \;;\; b = 2\sqrt[3]{\frac{1}{\varepsilon^2}} \;\text{//} \;;\; c = \frac{1}{\varepsilon} \;\text{//}$$

$$T(s) = \frac{1/\xi}{s^3 + 2\sqrt[3]{\frac{1}{\xi}}s^2 + 2\sqrt[3]{\frac{1}{\xi^2}}s + \frac{1}{\xi}} \implies \xi = 0,5088$$

$$T(s) = \frac{1,9654}{s^3 + 2,5052s^2 + 3,1381s + 1,9654} \implies \text{haciendo ruffini}$$

$$T(s) = \frac{1,2526}{s + 1,2526} \cdot \frac{1,2526^2}{s^2 + 1,2526s + 1,2526^2}$$

$$W_o = 1,2526 \; \text{//}$$

$$Q = 1 \; \text{//}$$

$$T(s) = \frac{W_o}{s + W_o} \cdot \frac{W_o^2}{s^2 + \frac{W_o}{Q}s + W_o^2} \; \text{//}$$